1. A therapeutic agent comprising

(a) a first domain that binds a first protein, the first protein having at least seven consecutive glutamine residues;

(b) a second domain that binds a second protein, the second protein having at least seven consecutive glutamine residues; and

(c) a third domain that separates the first domain from the second domain.

2. The therapeutic agent of claim 1, wherein the first protein and the second protein each have at least seven consecutive glutamine residues.

3. The therapeutic agent of claim 2, wherein the first protein and the second protein each have more than 37 consecutive glutamine residues.

4. The therapeutic agent of claim 1, wherein the first domain and the second domain are identical.

5. The therapeutic agent of claim 1, wherein the first domain or the second domain comprises a peptide.

6. The therapeutic agent of claim 5, wherein the peptide comprises at least three consecutive glutamine residues.

7. The therapeutic agent of claim 6, wherein the peptide comprises the first 17 amino acid residues of a huntingtin protein fused to 25 glutamine residues.

8. The therapeutic agent of claim 1, wherein the third domain comprises a peptide or other polymer.

9. The therapeutic agent of claim 8, wherein the peptide comprises an alpha-helical region or a beta-sheet.

10. The therapeutic agent of claim 6, wherein the third domain comprises LEGLVLTHQQFSSYEPELFPGLIYRMIKPRIVLLIFVSGKVVLTGAKVR-AEIYEAFENIYPILKGFRK (SEQ ID NO:11).

11. A therapeutic composition comprising the therapeutic agent of claim 1.

12. An isolated DNA molecule, wherein the DNA molecule encodes a polypeptide having three domains:

(a) a first domain that binds a first protein, the first protein having at least seven consecutive glutamine residues;

(b) a second domain that binds a second protein, the second protein having at least seven consecutive glutamine residues; and

(c) a third domain that separates the first domain from the second domain.

13. An expression vector comprising the isolated DNA molecule of claim 12.

14. A cell comprising the expression vector of claim 13.

15. A method of treating a patient who has a disease associated with expanded CAG repeats, the method comprising administering to the patient the therapeutic agent of claim 1.

16. The method of claim 15, wherein the disease is Huntington's disease (HD), primal and bulbar muscular atrophy (SBMA), dentatorubral-pallidoluysian atrophy, spinocerebellar ataxia type 1, type 2, type 6, or type 7, or Machado-Joseph disease (MJD/SCA3).

17. A method of treating a patient who has a disease associated with expanded CAG repeats, the method comprising administering to the patient the DNA molecule of claim 12.